Managing Lily Leaf Beetles through Parasitoid Release

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Abstract

Lilies, Fritillaria, and related native plants suffer defoliation due to a new invasive exotic pest, the lily leaf beetle. States in New England have had success in controlling this insect through biological control. This project is releasing these same parasitoids in four NY regions, monitoring results over a three-year period, and educating the green industry and consumers about the pest and its biological control through the CCE network.

Background and Justification

Cultivated and native Lilies and Fritillaria suffer defoliation in many locations in NY which have infestations of lily leaf beetle (*Lilioceris lilii*), a serious invasive exotic pest. Lily leaf beetle was first confirmed in NY in 2004 and continues to spread across the state, devastating landscape plantings of lilies. Nurseries and garden centers have reported problems with the lily leaf beetle damaging wholesale and retail host plants.

A survey of CCE educators conducted in the fall of 2015 found that lily leaf beetle has been detected in at least 30 counties. When asked to rate the level of damage caused by the lily leaf beetle, 73% of the respondents indicated that the damage levels was "High, with Lilies Devastated". Fifty-eight percent of respondents indicated that consumers stopped growing lilies because of the beetles. They also indicated that sales of both lilies and Fritillarias are down.
There are concerns regarding NY native lilies which host the lily leaf beetle as well. NY is home to three native lily species, *Lilium superbum, L. canadense L. philadelphicum*, each of which are considered rare or endangered in NY. In their natural environment we feel biological control will be the most sustainable solution for protecting these native plants from lily leaf beetle damage.

The three parasitoid biocontrols released in New England states have reduced the populations and damage caused by lily leaf beetle. We look forward to bringing this success to NY.

Objectives

This project is introducing lily leaf beetle parasitioids at locations across NY. Cooperators will be monitoring and reporting on the success of the establishment of these beneficials. As a result of this effort the appearance and survival of both the garden and native lily populations and the people who care for them will benefit from parasitoid/pest relationship and reduced pesticide usage.

In addition this project will train CCE educators and Master Gardener Volunteers on recognition and the lifecycle of both the lily leaf beetle and parasitoids. The outreach regarding invasive pests will highlight both the release of the biological control strategies and landscape practices (e.g. insecticides avoidance and habitat plantings) that support beneficial insects. Resources developed (press releases, presentation materials, displays) will be made available to other. educators throughout the state and region. As a result gardeners will adopt landscape practices that support beneficial insects in their gardens.

Procedures

Field Beneficial Release studies:

- Beneficials release permits submitted in January of 2016.
- Met with project collaborators at release site and supplier lab to set protocols for the release sites (Erie, Albany, Putnam & Suffolk Counties).
- Conducted baseline lily leaf beetle and biocontrol surveys at each site in spring of 2017.
- Released site-appropriate parasitoids in spring of 2017.

- In 2018 and 2019 we'll monitor for survival and establishment of beneficials along anticipated declines in lily leaf beetle and spread of biocontrols to surrounding sites.

Extension Outreach:

- A Powerpoint presentation was created collaboratively in order to reach master Gardeners and extend the reach of this project.

- Project Collaborators to deliver train-the-trainer programs for Master Gardeners and/or Master Naturalists, CCE educators and PRISM partners.

- We developed and are delivering gardener and green industry surveys regarding the Lily Leaf Beetle. Will conduct a second survey at the conclusion of the project. We plan to use the information from these surveys and from program evaluations to provide project feedback, determine program success, and impacts.

Results and Discussion

In 2017 the release sites were established in four counties, larvae were submitted from all sites to check for pre-existing parasitization and parasitoid releases were made at all locations. See table below for details.

Project Locations, Monitoring and Release Details

2017 Lily Leaf Beetle Parasitoid Release Sites			
Release Plot Name Location	Larvae Examined for Parasitoids	Parasitoids Released 2017	Proposed Releases 2018
Dan Gilrien Long Island Research and Education Center Display Garden 3059 Sound Ave, Riverhead, NY 11901 40°57.761' N, 72°43.049' W	6/20/17 39 larvae No parasitism	30 *Tetrastichus setifer* released 6/28	*T. setifer* *Diaparsis?*
Dan Gilrien 217 Arrowhead Ave. Riverhead, New York 11901 40°56.724' N, 72°40.209' W	6/20/17	50 *T. setifer* 6/23 50 *T. setifer* released 7/7	*Lemophagus errabundus*

Marie Camenares 27 Glenmere Way, Holbrook, NY 11741 40 °46.708' N, 73°03.426' W	6/20/17 2 larvae No parasitism	16 *L. errabundus* released 6/22	*Lemophagus errabundus* and *T. setifer*
Jennifer Stengle Lerner Tilly Foster Community Garden Putnam County, NY 41.419403 N -73.634613 W	6/10/17 8 larvae No parasitism	50 *T. setifer* released on 6/22	*Diaparsis jucunda*
Joellen Lampman CCE – Albany County 24 Martin Road Voorheesville, NY 12186 42.643722 N, -73.964076 W	6/26/17 12 larvae No parasitism	12 *D. jucunda* released on 6/28	*T. setifer and D. jucunda*
Sharon Bachman Buffalo Olmstead Conservancy 84 Parkside Ave., Buffalo, N.Y. 14214 Garden beds are located west of main building 42.932557, -78.852899	6/16/17 5 larvae No parasitism from MG's home in East Aurora	40 *T. setifer* released on 7/7	*D. jucunda*

Resources Developed

- Two surveys were created to track lily leaf beetle experiences among commercial green industry representatives and consumer gardeners / Master Gardeners. The results of this survey will be compared to a survey that will be conducted at the conclusion of the project.

- A PowerPoint presentation created by this project for outreach is available.

- Photographs of the parasitoids at release are available.